**CLAIM AMENDMENTS:**

Claims 1-10 (Canceled)

Claim 11 (Currently Amended): ~~1~~1. A process for fabricating a high density multi-layer microcoil comprising steps of:

providing a substrate;

using photolithography process to form a dry film photoresist structure with a coil tunnel having coil elements perpendicular to said substrate and two outlets at ends of said tunnel; and

injecting a conductive material with low melting point into said tunnel and forming a coil winding.

Claim 12 (Currently Amended): ~~1~~2. A process for fabricating a high density multi-layer microcoil according to claim ~~1~~1 wherein said steps of forming said photoresist structure depend on number of windings in each coil element; for a coil element with N windings, said windings are numbered as 1 to N from inner to outer; each coil winding is composed of a top parallel portion, a bottom parallel portion and two vertical portions and formed as a planar coil element perpendicular to said substrate; said photoresist structure is made by 4N+1 times of deposition, comprising steps of:

depositing first to 2Nth photoresist materials, using photolithography to form said lower half portions of said 1 to N windings of said coil elements; said lower haft portions comprises bottom parallel portions and lower halves of vertical portions;

depositing 2N+1 to 4Nth photoresist materials, using photolithography process to form said upper half portions of said N to 1 windings of said coil elements; said upper haft portions comprises upper halves of vertical portions and top parallel portions; and

depositing last (4N+1) photoresist material, using photolithography to form a top of said photoresist structure.

Claim 13 (Currently Amended): ~~13~~3. A process for fabricating a high density multi-layer microcoil according to claim ~~12~~ 2 wherein said dry film photoresist is chosen from high strength materials.

Claim 14 (Currently Amended): ~~14~~4. A process for fabricating a high density multi-layer microcoil according to claim ~~11~~ 1 wherein said coil winding is made of conductive materials with low melting point.

Claim 15 (Currently Amended): ~~15~~5. A process for fabricating a high density multi-layer microcoil comprising steps of:

providing a substrate;

using photolithography process to form a dry film photoresist structure for a lower half coil tunnel;

depositing an insulation layer on top of said lower half coil tunnel;

using photolithography process to form a magnetic core on said insulation layer and in center portion of said photoresist structure;

removing said insulation layer;

using photolithography process to form a dry film photoresist structure for an upper half coil tunnel, which covers said magnetic core, and forms a coil tunnel having coil elements perpendicular to said substrate and two outlets at ends of said tunnel; and

injecting a conductive material with low melting point into said tunnel and forming a coil winding.

Claim 16 (Currently Amended): ~~16~~6. A process for fabricating a high density multi-layer microcoil according to claim ~~15~~5 wherein said steps of forming said photoresist structure of lower and upper half coil tunnels depend on number of windings in each coil element; for a coil element with N windings, said windings are numbered as 1 to N from inner to outer; each coil winding is composed of a top parallel portion, a bottom parallel portion and two vertical portions and formed as a planar coil element perpendicular to said substrate; said photoresist structure is made by 4N+1 times of deposition, comprising steps of:

depositing first to 2Nth photoresist materials, using photolithography to form said lower half portions of said 1 to N windings of said coil elements; said lower haft portions comprises bottom parallel portions and lower halves of vertical portions;

depositing 2N+1 to 4Nth photoresist materials, using photolithography process to form said upper half portions of said N to 1 windings of said coil elements; said upper haft portions comprises upper halves of vertical portions and top parallel portions; and

depositing last (4N+1) photoresist material, using photolithography to form a top of said photoresist structure.

Claim 17 (Currently Amended): ~~17~~7. A process for fabricating a high density multi-layer microcoil according to claim ~~16~~ 6 wherein said dry film photoresist is chosen from high strength materials.

Claim 18 (Currently Amended): ~~18~~8. A process for fabricating a high density multi-layer microcoil according to claim ~~15~~ 5 wherein said coil winding is made of conductive materials with low melting point.

Claim 19 (Currently Amended): ~~19~~9. A process for fabricating a high density multi-layer microcoil according to claim ~~15~~ 5 wherein said magnetic core is made of high magnetic permeability materials.

Claim 20 (Currently Amended): ~~20~~10. A process for fabricating a high density multi-layer microcoil according to claim ~~15~~ 5 wherein said magnetic core is made of materials chosen from silicon dioxide and silicon nitride.